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**Wenhui Shi\*** ([wenhui.shi@hcm.uni-bonn.de](mailto:wenhui.shi@hcm.uni-bonn.de)). *Higher regularity for the fractional thin obstacle problem.*

We study the higher regularity of the regular free boundary in the fractional thin obstacle problem. Our strategy is to use a partial hodograph-Legendre transformation to fix the free boundary, and reduce the problem to the study of higher regularity of solutions to a degenerate elliptic fully nonlinear PDE. We show that this nonlinear PDE is a perturbation of a weighted Baouendi-Grushin Laplacian. By using an implicit function theorem argument, we show that the regular free boundary is smooth (real analytic) if the given obstacle is smooth (real analytic). This is a joint work with Herbert Koch and Angkana Rüland. (Received August 22, 2016)